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HIV/AIDS and Social Capital in a Cross-Section of Countries

Antonio C. David

The World Bank Group

Email: adavid2@worldbank.org

Abstract

This paper attempts to quantify the impact of the HIV/AIDS epidemic on social capital with cross-country data. Using data from the World Values Survey (WVS), the author estimates reduced-form regressions of the main determinants of social capital controlling for HIV prevalence, institutional quality, social distance and economic indicators. The results obtained indicate that HIV prevalence affects social capital negatively. The empirical estimates suggest that a one standard deviation increase in HIV prevalence will lead to a 1 percent decline in trust, controlling for other determinants of social capital. If one moves from a country with a relatively low level of HIV prevalence such as Estonia to a country with a high level such as Zimbabwe, one would observe an approximate 8% decline in social capital. These results are robust in a number of dimensions and highlight the empirical importance of an additional mechanism through which HIV/AIDS hinders the development process.

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JEL Classification: O11, O15, O57

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Introduction

The Social Development department of the World Bank states that the concept of social capital *"…refers to the norms and networks that enable collective action*[1]*"*. Although the concept of social capital is frequently used in rather vague ways in a large part of the social sciences literature, the basic idea is generally that elements such as trust, social norms and social networks make groups or organizations work more efficiently.

The same World Bank department also claims that "*Increasing evidence shows that social cohesion — social capital — is critical for poverty alleviation and sustainable human and economic development*". In fact, there have been a growing number of efforts attempting to quantify the influence of social capital on economic development, as we discuss in the main text. Furthermore, several authors have linked the HIV/AIDS pandemic to social capital (see for instance Gaffeo, 2003), usually pointing out how factors related to the disease such as stigma, discrimination and the costs posed by care for the sick as well as orphans erode and put pressure on social capital.

The objective of this paper is to attempt to quantify the impact of the epidemic on social capital using cross-country data. For this purpose, we will estimate reduced form regressions of the main determinants, as identified in the literature, of social capital, using national levels of trust from the World Values Survey (WVS) as a proxy for social capital. To our knowledge there have been no previous efforts to evaluate this empirical question.

With this objective in mind, we will briefly discuss in the first two sections the links previously identified in the literature between social capital, development and HIV/AIDS. Subsequently, we will present the data used for the cross-country regressions, which are described in detail in Appendix A. The fourth section addresses the results obtained from the estimation exercises for a sample including both developing countries and industrial economies. The fifth section presents additional regressions that aim to assess the robustness of the results obtained.

[1] http://intranet.worldbank.org/WBSITE/INTRANET/SECTORS/INTRANETSOCIALDEVELOPMENT/INTSOCIALCAPITAL/0,,menuPK:400228~pagePK:151716~piPK:176772~theSitePK:400220,00.html

The links between social capital and development

When one goes through the literature on social capital it is easy to identify three key components in most definitions of the concept: *trust, social networks and social norms.* Those elements form the foundation of the mechanisms through which social capital reduces uncertainty and transaction costs, discourages opportunistic behavior, fosters cooperation and increases the efficiency of markets and organizations, thus affecting economic development. Routledge and von Amsberg (2003), for instance, present a theoretical model where social capital affects economic growth by facilitating cooperative trade.

Formalizing the ideas previously outlined, an influential paper by Zak and Knack (2001) presents a general equilibrium model with heterogeneous agents and moral hazard to determine how trust varies across societies. They show that trust depends on the social, economic and institutional (formal and informal) context in which transactions occur. In particular, social heterogeneity and the quality of institutions to punish cheaters affect trust levels, with homogeneous and egalitarian societies showing higher trust. In their set-up, trust enhances growth by reducing the costs of transactions. Moreover, societies can get stuck in low-trust poverty traps.

As far as the empirical evidence on the link between social capital and development is concerned, Knack and Keefer (1997) using cross-country data find that trust and civic norms are significantly related to economic growth and investment. Knack (2002) finds that social trust leads to better governance. Zak and Knack (2001) test empirically the predictions of their model described above by extending the Knack and Keefer sample using later waves of the WVS that includes a number of developing countries. They corroborate the conclusion that trust affects economic growth. Beugelsdijk et al. (2004) perform a robustness analysis of the relationship between trust and economic growth and conclude that the Zak and Knack results are highly robust in terms of statistical significance of the estimated coefficients and reasonably robust in terms size of the estimated effects.

Another strand of the literature links link social capital with financial development, as it identifies high levels of trust as one of the main determinants of financial depth. Guiso et al. (2004) measure social capital through blood donation and

electoral participation and conclude that this variable is significant in explaining financial development. Nonetheless, as argued by Sabatini (2006), indicators such as blood donation and electoral participation are arguably outcomes of social capital rather than a measure of social capital itself. Furthermore, Garretsen et al. (2004) also show that societal norms and culture help to explain differences in cross-country financial development. Their indicators for social norms are obtained from survey data about the values of people working in local subsidiaries of IBM in more than 50 countries.

Durlauf (2002) and Sabatini (2006) discuss in detail the extensive challenges present in the empirical analysis of social capital, in particular, flaws in studies linking social capital to economic growth. A number of the indicators commonly used are measures of outcomes of social capital rather than social capital itself. Others rely on subjective perceptions that depend on the economic, social and historical context of the individuals being surveyed. Moreover, technical econometric difficulties abound such as identification problems, reverse causality, measurement error, among others.

Social capital and HIV/AIDS

A number of links have been explored between HIV/AIDS and economic performance. In addition to the more evident impacts of the disease on mortality, labor productivity and on household savings due to increased health expenditures, HIV/AIDS contributes to the persistence of poverty as it affects not only the stock, but also the accumulation of human capital[2]. Bell et al. (2004) calibrate an OLG model for South Africa taking into account the fact that when parents die orphans are threatened by financial distress and lack of care, which may lead to increases in the incidence of child labor and/or reduce school enrollment/attendance. They predict that family income could be up to 23,000 Rand lower by 2050 compared with the No-AIDS scenario. Bell et al. (2006) perform a similar exercise for Kenya and conclude that by 2040, GDP per adult will be 11% less than it would have been in the No-AIDS Scenario for that country.

Furthermore, Kalemli-Ozcan (2006) examines the impact of the epidemic on fertility decisions in a panel of African countries and concludes that HIV/AIDS affects the total fertility rate positively and school enrollment rates negatively. This author

[2] For a comprehensive review of the literature on the economic effects of HIV/AIDS see Haacker (2004).

argues that those results are consistent with theoretical models of precautionary demand for children in a high mortality environment that predict that in this context parents will choose to have less children and provide each child with less education. Hence, HIV/AIDS would contribute to reverse the fertility transition and accumulation of human capital leading to significant long-run impacts on welfare.

Moreover, the fact that social stigma and discrimination are frequently attached to HIV positive individuals, as pointed out by Gaffeo (2003) is of crucial importance for our objectives in this study. Zak and Knack (2001) show in their model described previously that discrimination lowers trust, hence there seems to be an indirect link between HIV/AIDS and development as the pandemic is possibly associated with increases in discrimination and through this channel to reduced economic performance.

In addition, a number of authors argue that HIV/AIDS also poses a considerable burden on traditional networks and coping mechanisms to address economic shocks, in particular in what concerns care for orphans and sick individuals. Foster (2006) for instance, argues that governments have been slow to react to the orphan crisis in sub-Saharan Africa that is intimately linked to the epidemic causing families and communities to in his words “shoulder most of the effort and costs”. This strain on social networks could lead to a negative impact on social capital or even to the disintegration of the existing mechanism to address shocks.

Haacker (2004) posits that HIV/AIDS has an effect on social and economic institutions of a country, which in turn would affect economic development. He argues that the epidemic contributes to deteriorating security at the individual, community and national level, in particular as governments’ capacities are eroded leading to increased crime and instability. This author also states that the epidemic could increase the vulnerability of a country to civil war.

Campbell et al. (2002) investigate a different causal relationship by focusing on the impact of social capital on health issues in a South African mining community, defining social capital in terms of people's membership of voluntary community or associations. They tested the hypothesis that organizational members were less likely to have HIV. They found mixed results that varied across age and gender.

Overall, one can conclude that HIV/AIDS is likely to have an impact on social capital through stigma and discrimination, through the burden it poses on traditional social networks that mitigate risks and through increased insecurity. The question that we will attempt to answer in subsequent sections is how large this effect is. This will allow one to assess the importance of this indirect channel through which HIV/AIDS affects the development process.

Overview of the data

The main dependent variable in our regressions is a measure of social capital obtained from cross-country data on national levels of trust from the World Values Survey (WVS)[3]. Using a nationally representative sample, the WVS provides a measure of "trust" given by the percentage of the population who answer yes to the question: "In general, do you think that most people can be trusted?" against the alternative that "you can't be too careful when dealing with people". We use data from the latest waves of the survey, which includes 6 sub-Saharan African countries (only Nigeria and South Africa were available in previous surveys). All the countries included in this study are listed in Appendix B.

Nonetheless, one has to acknowledge that this particular measure of social capital has been subject to a number of criticisms in the literature. The first one concerns the fact that it reflects individual perceptions of society and that one needs to take into account the social and historical context in which those perceptions are formed. Sabatini (2006) also argues that urban areas and better educated persons are usually overrepresented in the WVS. Another caveat concerning the survey question is that different respondents may have different interpretations of the question asked.

An alternative aggregate measure of social capital was proposed by Temple (1998), who refers to a "social capability" index, which is an assessment of a "society's suitability for institutional and economic development". Nonetheless, this measure was constructed in the early 1960s and therefore would not be suitable for our purposes. The literature proposes several other empirical proxies for social capital (see Sabatini, 2006 for a critical survey), including participation in voluntary associations, that are inadequate

[3] See http://www.worldvaluessurvey.org/ for additional information.

for our objectives for a number of reasons, including, the fact that they are not widely available across countries and the fact that they are outcomes rather than indicators of social capital, among other shortcomings.

We collected data on a number of determinants of trust that were identified and discussed in previous sections of this document. Those include HIV prevalence rates, governance indexes, measures of the quality of institutions (in particular regarding the control of corruption) and measures of social distance such as income inequality, ethnic and linguistic fractionalization. Moreover, following Alesina and La Ferrara (2002), we included measures of educational achievement as determinants of trust. Using individual level data for the United States those authors find that "successful people" in terms of income and educational achievement tend to trust more.

Finally, we also included the log of initial GDP (as measured by Dollar and Kraay, 2002) as a possible determinant of trust in some specifications. In the Zak and Knack (2001) moral hazard model trust is decreasing with wealth, as investors have more incentives to monitor brokers' behavior to protect their wealth, and increasing in wages[4]. Following this logic, the impact of the log of initial GDP (the proxy for those two economic factors at the national level) on trust is ambiguous. We refer the reader to Appendix A for a more comprehensive description of data and sources.

Preliminary empirical analysis

There are a number of econometric difficulties that are likely to arise when one undertakes cross-country regressions of the determinants of national levels of social capital as proxied by trust, resulting in problems in terms of bias and consistency of estimates obtained. Indeed, it is certainly the case that several of the variables considered below suffer from measurement error problems. In particular, it is well-known that the quality of the data concerning HIV prevalence rates is rather poor. Although a number of recent Demographic and Health Surveys (DHS) have collected more accurate and reliable data on prevalence rates, particularly in Africa, the cross-country availability of such data is very limited. In addition, our dependent variable (trust) was obtained from survey data

[4] The intuition here is that wages are considered to be the opportunity cost of investigating a broker in the model, so if this cost is high, there are more incentives to trust the broker.

and the problematic aspects of such data were discussed in previous sections. Once again, data availability for a large number of countries precludes us from using more reliable measures.

Moreover, omitted variables could present another serious potential problem. We tried to control for the different determinants of trust identified in the literature and present statistical tests to diagnose model misspecification in order to mitigate for the possibility that third factors are determining the relations obtained between HIV and social capital. Perhaps a more preoccupying possibility concerns the endogeneity of HIV prevalence rates to national levels of trust. We have attempted to mitigate this problem by ensuring that control variables are pre-determined i.e. we included values for periods before the WVS surveys took place, whenever possible. In addition, we will also present results from instrumental variables regressions in the next section, where HIV prevalence is instrumented by national circumcision rates. Finally, among other difficulties the presence of multiple regimes and non-linearities in the relationships studied is a clear possibility, particularly as the sample includes a number of so-called "transition" (former socialist) economies.

Bearing those caveats in mind, Table 1 presents results from a number of Ordinary Least Squares (OLS) regressions that consider the log of trust as the dependent variable, as specified in the expression below:

$$\log(Trust_i) = \alpha + \beta \log(HIV_i) + \mathrm{Y}_i^{/}\gamma + \varepsilon_i$$

where the first two terms on the right-hand-side refer to the constant and the log of HIV prevalence, Y_i is a vector containing other explanatory variables of trust and ε_i is a random error term. The coefficient β measuring the effect of HIV prevalence on trust is of particular interest to us.

Appendix C presents the correlation matrix between the regressors as well as a number of descriptive statistics. One should note that, with the possible exception of the variables measuring institutional quality, the correlations are not so high that they would impair obtaining estimates of separate impact of the regressors. When looking at the 10 different specifications presented in Table 1 a number of interesting conclusions emerge.

One should note that HIV prevalence presents a negative and statistically significant (at conventional levels) impact on trust through most specifications[5].

Specification (4), for instance, includes as explanatory variables: HIV prevalence, the rule of law index constructed by Kaufmann et al. (2006) and data on ethnic fractionalization from Alesina et al. (2003). As expected, both the estimated coefficients for HIV prevalence and fractionalization present negative signs, although the later is not statistically significant[6], whereas the rule of law index presents a positive and statistically significant coefficient. The results from this regression indicate that levels of trust are lower in countries with higher HIV prevalence.

In addition, since the data is expressed in logarithmic form the coefficient estimates can be interpreted as elasticities, indicating how sensitive trust is to increases in HIV prevalence. This implies that a 1% increase in HIV prevalence would result in a 0.65% decrease in trust or a one standard deviation increase in prevalence will lead to nearly 2% decline in trust. Nonetheless, the diagnostic statistics suggest that the results obtained in this specification should be interpreted with caution, since the null hypothesis that the model is not misspecified is not rejected at the 1 percent level, but is rejected at the 5 percent level.

Specifications (8) through (10) regress trust on HIV prevalence, different measures of institutional quality, the Gini coefficient for income inequality as a proxy for social distance and the log of initial income[7]. Diagnostic statistics for those regressions present more satisfactory results in terms of model specification, when compared to previous ones. As predicted by the theories discussed in previous sections, the Gini coefficient seems to affect trust negatively (i.e. greater income inequality reduces trust); whereas government effectiveness and control of corruption increase levels of trust (the coefficient for the rule of law index in specification (8) albeit positive is not statistically significant).

[5] For specification (9) the impact is only significant at the 12% level, which may be acceptable given the small sample size.

[6] Zak and Knack (2001) also fail to find a statistically significant linear relationship between trust and ethnic heterogeneity, more on this topic in the next section.

[7] Specification (7) indicates that our measure of educational achievement presents a negative coefficient that is only significant at the 11 percent level in a regression also controlling for HIV prevalence, rule of law, and income inequality measured by the Gini coefficient.

The HIV prevalence variable presents a negative coefficient varying in size from -0.327 in (9) to -0.369 in (10). As we have discussed previously, these figures can be interpreted as elasticities, indicating that a one standard deviation increase in HIV prevalence will lead to a one percent decline in trust, controlling for other determinants of social capital.

Overall, we may infer that the regressions presented here suggest that the idea that HIV/AIDS has a statistically and economically significant deleterious effect on social capital has some empirical support. This is an additional channel through which the epidemic represents a constraint to development in some parts of the world, in particular for the African continent. One has to bear in mind that the findings are subject to a number of caveats, including the possibility that the estimates are subject to endogeneity bias. In the next section we will perform several experiments to assess whether there is a fundamental change in the conclusions obtained, when we vary the specifications along various dimensions.

Table 1

HIV/AIDS and Social Capital OLS Estimates
Dependent variable is generalized level of trust from WVS

Control Variables:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
HIV prevalence	-0.963***	-0.779***	-0.694***	-0.652***	-0.835***	-0.369*	-0.363*	-0.337*	-0.327[b)]	-0.369*
	(0.229)	(0.179)	(0.171)	(0.198)	(0.295)	(0.211)	(0.219)	(0.200)	(0.209)	(0.207)
Control of corruption		0.048***								0.037[b)]
		(0.012)								(0.023)
Rule of law			0.052***	0.050***	0.056***	0.045***	0.064***	0.043		
			(0.012)	(0.011)	(0.012)	(0.011)	(0.016)	(0.029)		
Government effectiveness									0.049**	
									(0.022)	
Ethnic fractionalization				-0.024						
				(0.053)						
Linguistic fractionalization					0.055					
					(0.053)					
Gini coefficient						-0.119**	-0.150***	-0.133***	-0.142***	-0.13***
						(0.050)	(0.046)	(0.052)	(0.054)	(0.052)
Educational achievement							-0.052[a)]			
							(0.032)			
Initial income								0.003	-0.005	0.007
								(0.027)	(0.023)	(0.023)
Constant	0.246***	0.229 ***	0.223***	0.232***	0.205***	0.641***	0.833***	0.673**	0.766***	0.643**
	(0.013)	(0.013)	(0.013)	(0.020)	(0.016)	(0.178)	(0.172)	(0.293)	(0.264)	(0.281)
N	79	78	78	78	76	75	64	72	72	72
R-squared	0.068	0.267	0.289	0.290	0.303	0.340	0.395	0.355	0.371	0.352
RESET	0.419	0.010	0.038	0.043	0.027	0.045	0.080	0.181	0.697	0.076

Numbers in parenthesis are robust standard errors. *, ** and * denote statistical significance at the 10, 5 and 1 percent level respectively. N denotes the number of observations included (varies according to data availability). RESET refers to p-values for Ramsey's RESET misspecification test: Ho is that the model is not misspecified. a) This coefficient is significant at the 11 percent level. b) This coefficient is significant at the 12 percent level.**

Robustness of the results obtained

As argued by Beugelsdijk et al. (2004), robustness is a multi-dimensional concept that cannot be analyzed using a single indicator. In this section, we will use the term "robustness" as referring to our attempt to assess whether the results obtained in the previous section are sensitive to changes in the explanatory variables used, to changes in the sample composition, and to the use of different econometric techniques. We will concentrate in particular on the statistical significance and size of the estimated effect of HIV prevalence on trust.

The literature on the determinants of trust across countries, using a more limited set of countries and different fractionalization measures than ours, has presented a number of results indicating that trust might be a quadratic function of ethnic and linguistic homogeneity. Zak and Knack (2001) have argued that the rationale for these results is that in settings with a large number of small groups, no single group represents much of a threat to others; therefore the effective social distance is greatest at an intermediate range of the fractionalization measure.

Specifications (11) and (12) control for HIV prevalence, rule of law, ethnic fractionalization and its squared value and linguistic fractionalization and its squared value respectively. The results are qualitatively similar to the ones obtained in the previous section. The fractionalization measures remain statistically not significant, but the rule of law variable and HIV prevalence coefficient are significant at the 1 percent level and present the expected signs. Nevertheless, one should note that the RESET test rejects the null of no omitted variables for those models.

Subsequently, we limit the sample included in the regressions to developing countries exclusively, in order to check whether by considering only this sub-sample, one would observe changes in the results previously obtained. In fact, specifications (13) and (14) show that most regressors are no longer statistically significant; nonetheless HIV prevalence continues to present a negative and significant elasticity. The estimates indicate a 0.5% reduction in social capital for a 1% increase in HIV prevalence. The diagnostic statistics do not detect model misspecification, but results should be interpreted with caution given the small sample size (only 49 observations).

Furthermore, we attempt to account for the fact that HIV prevalence might be endogenous to social capital by instrumenting for this variable using national data for male circumcision rates obtained from WHO (2007) and Drain et al. (2006). The strategy of using circumcision rates as an instrument for HIV has been employed in a number of other papers for African countries, notably Kalemli-Ozcan (2006) and Werker et al. (2006), in the light of new medical evidence that male circumcision substantially reduces the risk of HIV transmission. Nevertheless, these studies were instrumenting for HIV using circumcision rates in the context of regressions for total fertility rates, school enrollment and economic growth, not social capital.

Specifications (15) and (16) are two-stage-least-squares (TSLS) regressions of trust on HIV prevalence, measures of institutional quality (control of corruption and rule of law respectively) and the Gini coefficient, where HIV prevalence was instrumented by circumcision rates. All the explanatory variables are statistically significant and present the expected signs. The estimated elasticities for the instrumented HIV coefficient are -0.447 and -0.376, which are of similar size to the ones obtained from OLS regressions in the previous section. Hence, our attempt to tackle the endogeneity issue does not substantially alter the conclusions already reached. Nevertheless, one should note the relatively high likelihood that circumcision rates are endogenous to national trust levels for religious or cultural reasons. Hence, circumcision rates could be an inadequate instrument in this case, as this variable may not be unrelated to trust.

In addition, we follow a large strand of the literature on the impact of institutions on economic development by using the log of settler mortality as an instrument for institutional quality as suggested by Acemoglu et al. (2001). Specification (17) is a TSLS regression of trust on HIV prevalence (instrumented by circumcision rates), control of corruption (instrumented by settler mortality) and the Gini coefficient. The coefficient estimates obtained for all controls variables have the expected signs and are of similar size when compared to the ones obtained in previous regressions**.** The Gini coefficient and the control of corruption variable are statistically significant at conventional levels, whereas HIV prevalence is not. Nonetheless, one should bear in mind that these should be interpreted with care given the very small sample size (we only have data available for 26 countries).

Finally, we check for effect of different proxies for the institutional quality variables on the results obtained. Specification (18) is similar to models (8) through (10), but includes the national average for the Law and Order index constructed by ICRG in the period from 1960-1995 as a proxy for institutional quality. One should note that the HIV coefficient and the Law and Order coefficient are not statistically significant in this case. The Gini coefficient survives as highly significant and initial income presents a positive and significant coefficient. Nevertheless, because of data availability, the sample size is smaller than some of the previous specifications. In addition, the RESET test rejects the null of no omitted variables at the 10% level (but not at the 5% level).

Moreover, specification (19) considers a model including the voice and accountability index constructed by Kaufmann et al. (2006), as a proxy for institutional quality. One should note that in this case, neither the HIV prevalence coefficient nor the voice and accountability coefficient are statistically significant. Nonetheless, the Gini coefficient is significant, presenting the expected negative sign, and so is the coefficient for initial income. But, the RESET test strongly indicates that this specification might suffer for omitted variables bias.

Overall, one can conclude that given the limitations in quality and availability of data, the conclusion obtained in the previous section that higher HIV prevalence is associated with lower social capital is maintained. Diagnostic statistics are not satisfactory for the specifications where the HIV coefficient is not significant, hence those results should be considered with caution. One should note that we chose to report only results deemed to be representative i.e. a number of additional specifications were estimated (by OLS and by TSLS) combining our explanatory variables in several ways, but the results were not substantially different from the ones reported both in terms of statistical significance and size of the coefficients.

Table 2
Sensitivity Analysis
Dependent variable is national level of trust from WVS

Control Variables:	**(11) OLS**	**(12) OLS**	**(13) OLS**	**(14) OLS**	**(15)[c] TSLS**	**(16)[c] TSLS**	**(17)[c] TSLS**	**(18) OLS**	**(19) OLS**
HIV prevalence	-0.747***	-0.834***	-0.470**	-0.511**	-0.447**	-0.376*	-0.458	-0.043	0.008
	(0.274)	(0.321)	(0.222)	(0.231)	(0.220)	(0.220)	(0.381)	(0.218)	(0.205)
Control of corruption					0.049***		0.044***		
					(0.011)		(0.012)		
Rule of law	0.048***	0.056***	-0.015			0.050***			
	(0.011)	(0.012)	(0.033)			(0.012)			
Government effectiveness				0.001					
				(0.026)					
Law & Order (ICRG)								-0.003	
								(0.014)	
Voice & Accountability									-0.027
									(0.035)
Ethnic fractionalization	-0.250								
	(0.172)								
Linguistic fractionalization		0.058							
		(0.139)							
EF or LF Squared	0.284	-0.003							
	(0.219)	(0.180)							
Gini coefficient			-0.066	-0.064	-0.118**	-0.119**	-0.293***	-0.212***	-0.168***
			(0.050)	(0.051)	(0.054)	(0.053)	(0.074)	(0.070)	(0.055)
Initial income			0.003	-0.006				0.045**	0.066**
			(0.029)	(0.025)				(0.020)	(0.030)
N	78	76	49	49	70	70	26	60	73
R-squared	0.307	0.303	0.111	0.106	0.372	0.371	0.572	0.369	0.340
RESET	0.012	0.078	0.412	0.746				0.099	0.000

All regressions include a constant term (always statistically significant), which was not reported to save space. Numbers in parenthesis are robust standard errors. *, ** and * denote statistical significance at the 10, 5 and 1 percent level respectively. N denotes the number of observations included. RESET refers to p-values for Ramsey's RESET misspecification test: Ho is that the model is not misspecified. c) Those specifications are Two-Stage-Least Squares (TSLS) regressions instrumented by circumcision rates or settler mortality as specified in the main text.**

Conclusion

The cross-country analysis performed in this study indicates that the notion that HIV/AIDS has deleterious effects on social capital at the national level has some empirical support. Our preferred specifications suggest elasticities of social capital to HIV prevalence in the order of 0.33 to 0.37. The empirical estimates predict that if one moves from a country with a relatively low level of HIV prevalence such as Estonia to a country with relatively high levels such as Uganda, one would observe an approximate 2.5% decrease in social capital. When one performs a similar thought exercise for Zimbabwe (where the epidemic has reached catastrophic proportions) rather than Uganda, the decline in social capital would amount to over 8%.

The estimates also suggest that measures of social distance, such as the Gini coefficient for income inequality, and measures of control of corruption, rule of law and government effectiveness are likely to be important determinants of social capital as well. The findings reported are subject to several caveats and are affected by problems of data availability, measurement error, omitted variables and limitations of econometric techniques. Nonetheless, the negative impact of HIV prevalence on social capital is reasonably robust to changes in explanatory variables, estimation methods and sample composition.

The HIV/AIDS epidemic represents a significant barrier to development on a number of dimensions. The implications of the disease in terms of productivity, human capital, savings and fiscal policy among others, have been subject to significant empirical scrutiny. This study intended to fill a gap in terms of assessing and confirming the empirical importance of the impact of the disease on social capital, highlighting an additional channel that needs to be taken into account in the policy debate.

This channel is particularly important if social capital is deemed to be important for well-being as indicated by economic theory as well as the available empirical evidence. Our results seem to support the validity of efforts being undertaken to address the potentially large social impacts of the HIV/AIDS epidemic.

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Appendix A

Overview of Data & Sources

Series	Description/Notes	Source
HIV prevalence	Log of (1+HIV prevalence) in 2003, alternative measures include most recent data from UNAIDS website and data from the US Census Bureau from 1990-1998 or earliest available thereafter.	World Bank's World Development Indicators (WDI), UNAIDS, US Census Bureau.
Trust	% of valid respondants answering that most persons can be trusted. Latest available data, but also estimates performed with earliest available for each country and averages over different survey waves. In Logs.	World Values Survey
Control of corruption	Value of estimate for 1996 or earliest available.	Governance Matters V dataset by Kaufmann et al. (2006).
Rule of law	Value of estimate for 1996 or earliest available.	Governance Matters V dataset by Kaufmann et al. (2006).
Government effectiveness	Value of estimate for 1996 or earliest available.	Governance Matters V dataset by Kaufmann et al. (2006).
Voice & Accountability	Value of estimate for 1996 or earliest available.	Governance Matters V dataset by Kaufmann et al. (2006).
Ethnic fractionalization		Alesina et al. (2003).
Linguistic fractionalization		Alesina et al. (2003).
Gini coefficient	Average for the period 1980-1997 or earliest available data thereafter. Expressed in Logs.	WDI
Educational achievement	Years of education for the population aged 25 and over in 1985 or earliest available thereafter. Expressed in Logs.	Barro and Lee (2000)
Settler Mortality	Expressed in Logs.	Acemoglu et al. (2001)
Male Circumcision Prevalence Rate		Drain et al. (2006) and WHO (2007)
Law and Order	Average Score 1960-1995	ICRG
Initial income	Log of real per capita GDP in 1985, USD at PPP	Dollar and Kraay (2000).

Appendix B

List of Countries Included in Regressions

Albania	Algeria	Italy	Slovakia
Argentina	Ecuador	Jordan	Slovenia
Armenia	Egypt	Japan	Sweden
Australia	Spain	Korea	Turkey
Austria	Estonia	Lithuania	El Salvador
Azerbaijan	Finland	Luxembourg	Tanzania
Belgium	France	Latvia	Uganda
Bangladesh	UK	Morocco	Ukraine
Bulgaria	Gerogia	Moldova	Uruguay
Bosnia	Ghana	Mexico	United States
Belarus	Greece	Macedonia	Venezuela
Brazil	Croatia	Malta	Vietnam
Canada	Hungary	Nigeria	Serbia/Montenegro
Switzerland	Indonesia	Netherlands	South Africa
Chile	India	Norway	Zimbabwe
Colombia	Ireland	New Zealand	Portugal
Czech Rep.	Iran	Pakistan	Romania
Germany	Iceland	Peru	Russia
Denmark	Israel	Philippines	Singapore
Dominican Rep.	Saudi Arabia	Poland	

Appendix C
Correlation Matrix and Descriptive Statistics

	Initial Income	Rule of Law	Control of Corruption	Government Effectiveness	HIV Prevalence	School Attainment	Gini Coefficient	Ethnic Frac.	Linguistic Frac.
Initial Income	1.00								
Rule of Law	0.86	1.00							
Control of Corruption	0.83	0.97	1.00						
Government Effectiveness	0.86	0.97	0.95	1.00					
HIV Prevalence	-0.31	-0.17	-0.11	-0.17	1.00				
School Attainment	0.65	0.60	0.58	0.59	-0.25	1.00			
Gini Coefficient	-0.24	-0.31	-0.28	-0.26	0.38	-0.43	1.00		
Ethnic Fractionalization	-0.45	-0.47	-0.46	-0.40	0.27	-0.37	0.45	1.00	
Linguistic Frac.	-0.38	-0.21	-0.20	-0.14	0.34	-0.25	0.15	0.62	1.00

Variable	Obs	Mean	Std. Dev.	Min	Max
Ethnic Frac.	80	0.356	0.228	0.002	0.930
Ling. Frac.	79	0.313	0.266	0.002	0.923
School	68	1.785	0.488	0.507	2.460
HIV	79	0.010	0.031	0.000	0.200
Trust	81	0.237	0.112	0.028	0.510
Law	80	0.442	1.021	-1.205	2.169
Corruption	80	0.377	1.050	-1.200	2.238
Government	80	0.518	1.060	-1.217	2.505
Gini	76	3.554	0.246	3.073	4.081